

## **JSHS STEM Courses**

### **Makey Makey - 7th Grade**

In this course, the students will have an opportunity to learn about circuitry by experimenting with a Makey Makey invention kit. They will take everyday objects and turn them into touch-pads, that when combined with the Internet, will allow them to make and run a variety of applications. Setting up and presenting these applications requires a variety of skills and problem-solving strategies. Students will also prepare projects for the annual STEAM Showcase.

### **Video Editing - 7th Grade**

Students in the STEAM Video class will learn how to make and edit movies in iMovie by learning how to use the video making software and app which is available on iPhones and iPads. Student groups will be provided iPads with the iMovie App. They will learn about camera angles and their impact on an audience, editing techniques, how to make story boards, and they will also learn how to write a script. Finally, students will put all this together to make a two to three minute short film that will include location shots (somewhere on campus), lighting, sound, special effects and dialogue. Many students come into the class with significant knowledge of the iMovie Software and will be allowed to explore more advanced editing features to create more sophisticated films.

### **STEAM Arts and Bots - 7th Grade**

This class will focus on teaching students the basics of coding and applying the engineering design process. Students will use the Hummingbird Duo robots to construct materials that represent a current event article of their choosing. The students will add lights, sounds, and movement to their project. They will then work with the Speckle, a new educational technology from the Carnegie Mellon CREATE Lab. The Speckle combines indoor air quality monitoring with engineering design. Students build the Speckle and use it to collect indoor air quality data. Next, they design and construct a housing unit for the Speckle, making it user-friendly while still functional. Lastly, students will design an ad to market the Speckle housing unit they engineered.

### **K'Nex Engineering - 7th grade**

This class is designed for students to explore the concepts of engineering and programming. Students build K'Nex models and then create programs, through a K'Nex software program, to control the movement of the model. They also conduct experiments with the models and analyze the results.

### **Science Research/PJAS - 8th Grade**

This class will teach students the methods of scientific research, including the treatment of variables, hypothesis testing, the graphical analysis of data, statistical analysis, writing conclusions, and the presentation of research. These skills will be developed as students work individually to conduct their own scientific research on a topic of their choosing. As a culminating project, students will be required to present their research at the regional Pennsylvania Junior Academy of Science (PJAS) competition and the Pittsburgh Regional Science and Engineering Fair (PRSEF). Students who select this course have a great deal of interest in the subject of science, are able to work independently on an extended project, have good organizational and time management skills, and a strong work ethic.

### **Animation - 8th Grade**

This class will teach students to build on the idea of gamification and begin creating their own animations. Using the programming tool, Alice, students can create their own programs in which characters follow commands. These basic programming skills will transfer to other programming languages. They will then harness their creativity and venture into the world of app creation and development.

### **Steam Competition - 8th Grade**

In STEAM Competitions, each nine weeks, the class will focus on a different topic in preparation for high level competitions that students may attend over the course of the school year. The focus of the first quarter will be math. Students will play Equations, work through high level problems, and learn RobotC in preparation for robotics competitions. The second nine weeks will focus on chess, 3D design, and planning for the battery car race. During the third quarter, students will prepare for the fluid power challenge competition, continue working on RobotC, and begin preparing for the Mock Trial. For the final nine weeks, students will continue working on programming and work on a project for the PA Computer Fair or the Plttsburgh Regional Science Fair.

### **What's nExT - 8th Grade**

In this course, students will work through a series of modules based on the following topics: Mobile Learning, Online Presence and Collaboration, Digital Storytelling, Augmented and Virtual Reality and other Emerging Technologies. Some of the projects completed will include creating webcasts, blogs, vlogs, wikis, working with Augmented and Virtual Reality, tools for Digital Storytelling, and learning how to screencast.

### **Robotics - Grades 9-12**

This course will emphasize the use of robotics to teach basic and advanced problem-solving techniques and programming that requires the integration of math and science skills. Students will be introduced to the easyC programming language. Students will also learn to build robots and write programs to enable the robots to complete a variety of challenges.

Students will be following the Autodesk's VEX Robotics Curriculum, which provides resources for the delivery of a pre-engineering design course in Robotics and computer-aided design. Students will use the software program called Autodesk Inventor to design and create drawings of multiple robotic parts. Autodesk's VEX Robotics Curriculum also incorporates the principles of STEM education into each unit and maps them directly to U.S. & National Academic Standards. The STEM Connections support students in acquiring an understanding of the complex and deep interrelationships among science, technology, engineering, and math.

A large part of this course will involve working creatively to solve authentic challenges. Challenges will range in difficulty from simple tasks to multi-step activities that may require days or weeks to complete. The challenges will require students to consider both the physical demands placed upon a robot as well as the programming required to enable a robot to complete the stated tasks. Furthermore, students may also engage in a group effort to complete challenges as part of a regional robotics competition.

### **Technology Education - Grades 9-12**

Technology I course focuses on an in depth study of 4 technology areas, communication, manufacturing, construction, and transportation. A main part of the course centers around mechanical drawing and computer aided design as a basis for all projects completed during the year. Students begin to develop skills in design and draw parts according to size and specifications. Students then begin to build on that knowledge and complete problem solving activities which involve producing a real-life part, testing, analyzing and redesigning if necessary. Once the mechanical drawing phase is complete, students then transition to a computer aided design software called Autodesk Inventor where students begin to design parts 3-dimensionally. Students will develop the ability and knowledge to correctly use tools and materials to answer questions and explanations while solving problems. A few projects include: 3D printing a finish product, CO2 car, boat hull, bridge destruction test, and catapult design.

### **Computer Graphics & Design I and II - Grades 9-12**

**Computer Graphics and Design I** will consist of a unit dedicated to understanding elements of

graphic design by using Adobe Illustrator and Photoshop. Students will also be given a brief overview and training on learning how to use digital cameras, scanners, disc publisher, vinyl cutting, sublimation, and screen printing. A few projects include: musical poster, movie poster, CD album, magazine cover, digital manipulation, and business card.

**Computer Graphics and Design II** is a continuation of graphic design where students develop advanced skills in the areas of illustrations, graphic design, page layout, and image manipulation. Students will use these developing skills in several design applications which may include: product designs, movie posters, musical poster, game cover design, cell phone designs, vinyl design and much more. Software includes: VE Lxi software, Photoshop, Illustrator and Makerbot desktop.

### **Software Application - Grades 9-12**

As our world relies more on computers to handle everyday work and leisure activities, the features of Microsoft Word, PowerPoint, and Excel are vital. This hands-on course is designed to instruct students to the functional uses of computer software. Whether you are emailing a friend, developing a class presentation, or compiling statistics for the track team, software application knowledge can make the task an easier one.

### **Computer Application - Grades 9-12**

This is a hands-on course where students will use Micro Type Multimedia and Micro Pace software packages in a networked classroom environment to develop proficiency with keyboarding speed and accuracy. Students will apply their skill to produce documents using the introductory fundamentals of Microsoft Word, PowerPoint, and Excel software, as well as Internet research.

### **Publishing - Grades 10-12**

This course is designed to get students involved in producing both the junior high yearbook and the senior high yearbook. Students work collaboratively to make theme and design choices, as well as meet essential deadlines. They will have hands-on experience in the field photographing all important events during the school year and promoting print advertisements to help meet budget limits. They also take active roles in marketing the publications to the student body. The final products are truly yearbooks made by the students for the students of Riverview. Students must be able to dedicate time outside of the regular classroom period.

### **Computer Science I and II - Grades 10-12**

“Computing is not about computers anymore. It is about living.”-N. Negroponte.

What careers are you interested in...possibly Engineering, Communications, Business, Mathematics, Science, Education, etc.? No matter what you decide, computers will be there! The purpose of this course is to provide students with basic software development skills using various programming environments including animation (virtual worlds, etc.) with Alice and object oriented programming with Visual Basic. Students will learn to create software in an interactive environment to analyze everyday problems, develop algorithms, design window interfaces and produce code. This course is a prerequisite course for Computer Science II Advanced Placement.

**Computer Science II** is designed for the student who is interested in advancing his/her programming knowledge. Emphasis is placed on the in-depth study of algorithms and data structures in an object oriented programming environment using the Java programming language. The student will be involved in the analysis and development of programming code and the logical thought processes involved in solving higher-level problems. At the completion of this course, students are encouraged to take the AP Computer Science exam.

## **E-commerce and Web Page Design - Grades 10-12**

This semester course will provide students with the knowledge and experience to create eye pleasing, content-rich web pages using the popular and widely-used web design software, Dreamweaver. By learning the major capabilities of Dreamweaver, HTML, and Flash, students will be able to produce professional websites. This interactive course will increase student's PC knowledge for college and beyond.